

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCE**

Application No.: 10/824,291  
Appellants: MUHS, J. D. et al.  
Filing Date: 04/14/2004  
Confirmation No.: 6054  
Title: Hybrid Solar Lighting Distribution Systems and Components  
Examiner: Mowla, Golam  
Group Art Unit: 1795

Mailstop Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Sir:

In furtherance to the Notice of Appeal filed 8/13/2008 and the Notice of Panel Decision from Pre-Appeal Brief Review mailed 8/26/2008, this is an appeal from the decision of the Examiner finally rejecting claims 1, 3-6 and 8-12 of the above-identified application.

**(1) REAL PARTY IN INTEREST**

The real party in interest is UT-Battelle, LLC, the assignee of record of the entire right, title, and interest in and to the invention and application for patent thereon from the inventor Jeffrey D. Muhs as recorded in the USPTO at Reel 015225, Frame 0485. UT-Battelle, LLC, is a 50-50 private not-for-profit limited liability partnership between the University of Tennessee and Battelle Memorial Institute. The United States has an interest in this invention because the invention was made under contract to UT-Battelle from the United States Department of Energy.

(2) RELATED APPEALS AND INTERFERENCES

Appellants, their legal representative and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

(3) STATUS OF THE CLAIMS

Claims rejected: 1, 3-6 and 8-12

Claims allowed: none

Claims canceled: 2 and 7

Claims withdrawn: none

Claims on Appeal: 1, 3-6, 8-12 (See copy of claims on appeal, including entered amendments, in attached Claims Appendix).

(4) STATUS OF AMENDMENTS AFTER FINAL

After final rejection dated 10/19/2007, Appellants submitted a Request for Continued Examination accompanied by Amendment B on March 19, 2008, which the Examiner entered via Office action mailed May 28, 2008. None of the claims on appeal, that is claims 1, 3-6, and 8-12 were amended via Amendment B. No amendments were submitted after final rejection dated 05/28/2008 that issued on the Request for Continued Examination.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' invention is directed to, *inter alia*, a hybrid solar lighting distribution system and components for distributing visible light as shown in Figures 1-3 and 5-8, and described in paragraphs [0022] through [0024] of the Specification. With regard to independent claim 1, sunlight is filtered and only visible light is reflected onto a fiber receiver (32). (Figs. 1 and 6; Para [0022]). The fiber receiver (32) includes a mixing rod (40) removably disposed in a receiver housing (42). (Fig. 7; Para [0023]). A fiber (43) is at least partially disposed in the housing (42) and engaged with the mixing rod (40). (*Id.*) Light emerges from the mixing rod (40) into the fiber (43). (*Id.*) The fiber (43) transmits the visible light to a light distribution system that includes at least one fiber distribution panel (124) that serves as a "plug and play"

source to feed multiple fixtures such as hybrid luminaires (126), which spatially distribute the visible light. (Fig. 8, Para [0026], [0027]). The relative intensity of both the fiberoptic-delivered sunlight and electric light spatially distributed by the hybrid luminaire (126) is controlled based on the lighting sensed in a lighted area. (Fig. 8, Para [0026]; Para [0042] – [0050]).

Additionally, adaptive color matching of sunlight is performed using hybrid LED luminaires. (Fig. 11, Para [0025]). Seamlessly balancing fiberoptic transported solar light and lamp light is important because a shift between artificial and solar lighting can be noticeable to an occupant. (Para [0042]). The means plus function limitation “means for controlling at least one of said hybrid luminaire and said light distribution system” thus corresponds to a control system including at least one photosensor and using the sensed light to control the relative intensity of the solar light and the artificial light emitted at the hybrid luminaire. (*See Figs. 8 and 11, Paras [0025] – [0026] and [0042] – [0050]*). The hybrid solar energy distribution system of claim 1 comprising the above has utility at least in collecting natural light at a central location and distributing the same to multiple luminaires. (*See Para [0026]*).

With regard to independent claim 5, a hybrid collector includes a primary mirror (30) concentrates the entire solar spectrum of incoming sunlight onto a secondary mirror (31). (Figs. 1-6, Para [0022] – [0023]). The secondary mirror (31) filters the full solar spectrum and reflects only visible light onto a fiber receiver (32). (*Id.*; Fig. 7, Para [0023]). The fiber receiver (32), as discussed above with regard to claim 1, includes a mixing rod (40) removably disposed in a receiver housing (42). (Fig. 7; Para [0023]). A fiber (43) is at least partially disposed in the housing (42) and engaged with the mixing rod (40). (*Id.*) Light emerges from the mixing rod (40) into the fiber (43). (*Id.*) The fiber (43) transmits the visible light to a light distribution system that includes at least one fiber distribution panel (124) that serves as a “plug and play” source to feed multiple fixtures such as hybrid luminaires (126), which spatially distribute the visible light. (Fig. 8, Para [0026], [0027]). The relative intensity of both the fiberoptic-delivered sunlight and electric light spatially distributed by the hybrid luminaire (126) is controlled based on the lighting sensed in a lighted area. (Fig. 8, Para [0026]; Para [0042] – [0050]).

Additionally, adaptive color matching of sunlight is performed using hybrid LED luminaires. (Fig. 11, Para [0025]). Seamlessly balancing fiberoptic transported solar light and lamp light is important because a shift between artificial and solar lighting can be noticeable to

an occupant. (Para [0042]). The means plus function limitation “means for controlling at least one of said hybrid luminaire and said light distribution system” thus corresponds to a control system including at least one photosensor and using the sensed light to control the relative intensity of the solar light and the artificial light emitted at the hybrid luminaire. (See Figs. 8 and 11, Paras [0025] – [0026] and [0042] – [0050]). The claimed hybrid collector of claim 5 comprising the above has utility at least in collecting natural light at a central location and distributing the same to multiple luminaires. (See Para [0026]).

#### (6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 3-6, and 8-12 are unpatentable under 35 U.S.C. § 103 (a) over the “Muhs Reference” (J.D. Muhs, “Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems”, Solar 2000, July 16-21, 2000, American Solar Energy Society) in view of “Levinson” (US Pat. No. 5,271,079).

#### (7) APPELLANTS' ARGUMENTS

##### Claims 1, 3-6, and 8-12 are Patentably Distinguished Over The Cited References

Independent claims 1 and 5 meet the nonobvious requirement of 35 U.S.C. § 103 (a) because the cited combination of Muhs and Levinson does not disclose all of the limitations recited in claims 1 and 5, specifically neither Muhs nor Levinson disclose a fiber distribution panel as claimed in claims 1 and 5. Consequently, dependent claims 3 and 4 depending from claim 1 and dependent claims 6 and 8-12 depending from claim 5 are also nonobvious and allowable.

Specifically, independent Claims 1 and 5 are directed toward a hybrid solar energy distribution system and a hybrid collector system, respectively. Both of these independent claims include “at least one fiber distribution panel.” Figure 8 depicts a fiber distribution panel 124 and Paragraph [0026] describes a fiber distribution panel as follows: “[a] centrally located fiber distribution panel can serve as a ‘plug and play’ source to feed multiple fixtures with sunlight.” As one of skill in the art would recognize and as shown and described in Appellants’ application, the plug and play capabilities of the fiber distribution panel (124) provide useful functionality such as the ability to connect to and feed multiple hybrid luminaires (126). The Office Action points to

Figure 6b in the Muhs Reference (reproduced below) as disclosing a fiber distribution panel. Figure 6b shows a close-up view of large-core optical fiber ends as indicated in its caption. The large core optical fibers pass through a rectangular aperture defined by the primary mirror and into an angled, hollow mount. The undersigned has reviewed Muhs and can find no description or depiction of a fiber distribution panel as described and claimed in the application on appeal (reference number 124 as shown in Figure 8 of the application on appeal, reproduced below). In this case, the Examiner is making an assumption that the Muhs reference discloses a plug and play fiber distribution panel, because there is no evidence or suggestion in the Muhs reference of a plug and play fiber distribution panel as described, shown in Figure 8, and claimed.

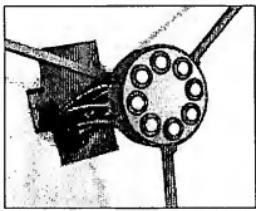


Figure 6b. Close-up view of large-core optical fiber ends.

Figure 6b of Muhs Reference

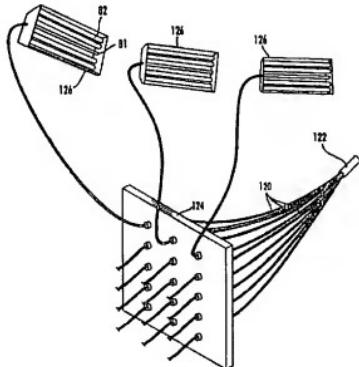


Figure 8 of Appellants' application

Muhs Reference Figure 6a (reproduced below, including an excerpt having a preamble and reference number description) is helpful in further illustrating the elements shown in Muhs Figure 6b. Notably, although the elements of the hybrid solar collector are numbered and referred to in Figure 6a, no centrally located, plug and play fiber distribution panel for feeding multiple fixtures with sunlight is referred to, described or suggested with reference to Figure 6a, 6b, or in the remainder of the Muhs reference.

Figures 6a and 6b illustrate the preferred design for the hybrid solar collector.

Figure 6a includes numeric references to individual components in the preferred design as follows:

1. ~ 0.8 meter radius primary mirror;
2. ~ 0.125 meter radius SOE with accompanying concentrating PV cell;
3. concentric fiber mount assembly (see Figure 6b);
4. approximately eight 18-mm large-core optical fibers (Note: The size of the primary mirror will dictate the actual number and size of fibers required);
5. angled, hollow mount to reduce range of motion needed for altitude tracking ( $\pm 40^\circ$  required tracking motion); and
6. a conventional rotational tracking mechanism.

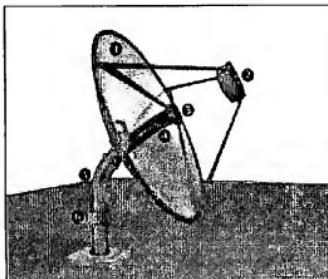


Figure 6a. Preferred design with numerical references to individual components.

Figure 6a of Muhs Reference

Appellants are unsure which element shown in Figure 6b that the Examiner has mistaken for a fiber distribution panel as claimed. Therefore, Appellants will briefly discuss

several of the elements shown in Figure 6b. One element of Figures 6a and 6b, the fiber mount assembly (shown in Figure 6a, ref. no. 3) merely “mounts” the large core fiber ends in the proper position for receiving sunlight reflected from the secondary mirror as shown and described in the Muhs Reference. It is not located centrally to multiple hybrid luminaire. Nor does it function as a plug and play device for connecting to and feeding multiple fixtures, such as hybrid luminaire, with sunlight. *See Para [0026].* Therefore, it does not perform a similar function as the fiber distribution panel and does not correspond to a fiber distribution panel as claimed. Figures 6a and 6b also show an aperture defined by the primary mirror (as shown below in the excerpt from the Jeffery D. Muhs Declaration). This aperture could not correspond to a fiber distribution panel because it is a space not a thing. Finally, the large core optical fibers pass into an angled, hollow mount (shown in Figure 6a, ref. no. 5; and shown through the aperture of Figure 6b). An angled, hollow mount is not a fiber distribution panel as claimed.

It is further evident that Figures 6a and 6b do not illustrate a fiber distribution panel because the fiber distribution panel of the present application is typically located centrally to multiple hybrid luminaire, and no hybrid luminaires are shown in either Figure 6a or 6b. *See Para [0026].* In the present application, once natural light is collected by the fiber receiver as claimed, the light is transmitted to a light distribution system. This light distribution system is separate and distinct from the fiber receiver as described and claimed. The light distribution system has a fiber distribution panel that receives the light transmitted from the fiber receiver. This fiber distribution panel is centrally located to the multiple hybrid luminaires and distributes the collected light to the multiple hybrid luminaires. *See Para [0026].* Thus, the absence of even a single hybrid luminaire in either Figure 6a or 6b indicates that a fiber distribution panel as described in the present application is not present in either figure of the cited reference as asserted by the Examiner.

Additionally, the author of the Muhs Reference has asserted no fiber distribution panel is disclosed in the Muhs Reference. The Appellants submitted a declaration concurrently with the Notice of Appeal executed by Jeffrey D. Muhs declaring the substance of Figure 6b in the Muhs Reference and attesting to the fact that a fiber distribution panel is not depicted in Figure 6b or described anywhere in the Muhs Reference. *See Declaration of Jeffrey D. Muhs filed 8/13/2008,*

Evidence Appendix A. This declaration was made of record in the case and was considered at least by the Examiner and the Examiner's Supervisor during the pre-appeal brief review. *See* Summary of Examiner Conferences filed 9/30/2008, Evidence Appendix B. The Examiner and the panel considered the declaration unpersuasive evidence that for nonobviousness of the Appellants' claims. The panel maintained that a fiber distribution panel is disclosed in the Muhs Reference, specifically that Figure 6b of the Muhs Reference depicted a fiber distribution panel.

As shown by the excerpt from the Muhs Declaration reproduced below, large core optical fibers originate at a fiber mount assembly and pass through a rectangular aperture defined by the primary mirror and into an angled, hollow mount. There is no plug and play fiber distribution panel as contemplated, described and claimed in the Appellants' claims. *See* Figure 8, no. 124 reproduced above.

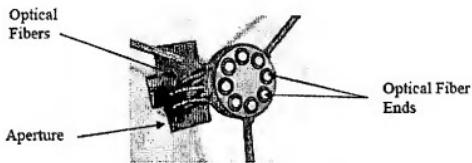


Figure 6b. Close-up view of large-core optical fiber ends.

Excerpt from Declaration of Jeffrey D. Muhs

The Examiner does not assert that Levinson fills that shortcoming in Muhs, so consequently all of the limitations of Claims 1 and 5 are not taught or disclosed in the combined references. Since the combined references fails to teach or disclose all of the elements of the claims 1 and 5, the Appellants respectfully assert that Claims 1 and 5 are not rendered obvious by Muhs in view of Levinson, and the Appellants request that the rejection of Claims 1 and 5 as being obvious from Muhs in view of Levinson be reversed, and that Claims 1 and 5 be allowed.

Claims 3-4 depend from claim 1 and claims 6 and 8-12 depend from claim 5 and are patentable over Muhs and Levinson for the same reasons claims 1 and 5 are patentable over these references. The other cited references fail to provide the limitations missing from Muhs and Levinson. Accordingly, the rejections of claims 3-4, 6, and 8-12 should be reversed.

(8) CONCLUSION

Appellants respectfully submit that the rejection of claims 1, 3-6, and 8-12 for nonobviousness is improper because the combination of the Muhs and Levinson references does not disclose, teach or suggest "at least one fiber distribution panel" as claimed. For this reason it is respectfully submitted that the rejection is improper and it is requested that it be reversed.

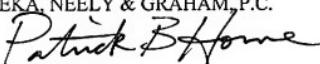
Due to the urgency of this matter and its economic implications, an expedited review of this appeal is earnestly solicited.

**In the event this response is not timely filed, Applicant(s) hereby petition for the appropriate extension of time and request that the fee for the extension along with any other fees which may be due with respect to this paper be charged to our Deposit Account No. 12-2355.**

Respectfully submitted,

LUEDEKA, NEELY & GRAHAM, P.C.

By:



Patrick B. Horne

Registration No. 58,753

Date: 10/10/2008  
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**37 CFR 41.37 (c)(1)(viii) CLAIMS APPENDIX**

Claims involved in the Appeal:

1. (Previously presented) A hybrid solar energy distribution system comprising:
  - at least one fiber receiver for receiving visible light further comprising:
    - a receiver housing,
    - a mixing rod removably disposed in said receiver housing,
    - a fiber at least partially disposed in said housing and engaged with said mixing rod, said fiber further transmitting visible light to a light distribution system further comprising:
      - at least one fiber distribution panel;
      - at least one hybrid luminaire; and
      - a means for controlling at least one of said hybrid luminaire and said light distribution system.
2. (Canceled).
3. (Original) The hybrid solar energy distribution system of Claim 1 wherein said hybrid luminaire comprises at least one of the lighting types selected from the group consisting of direct, indirect, cove, spot, compact fluorescent, track, recessed down-lighting, LED, sunlight, and perimeter point source lighting.
4. (Original) The hybrid solar energy distribution system of Claim 1 wherein said fiber further comprises a thermally compressed fiber bundle.
5. (Previously presented) A hybrid collector comprising:
  - a primary mirror for producing reflected full spectrum solar radiation,
  - a secondary mirror supported in position for receiving said reflected full spectrum solar radiation and further filtering said full spectrum solar radiation into visible light that is reflected onto a fiber receiver, said fiber receiver further comprising:
    - a receiver housing,

a mixing rod removably disposed in said receiver housing,  
a fiber at least partially disposed in said housing and engaged with said mixing rod,  
said fiber further transmitting visible light to a light distribution system further comprising;  
at least one fiber distribution panel;  
at least one hybrid luminaire; and  
a means for controlling at least one of said hybrid luminaire and said light  
distribution system.

6. (Original) The hybrid collector of Claim 5 wherein said secondary mirror is supported by a secondary mount further comprising;

a non-rigid structure that blocks less than 5% of said reflected full spectrum solar radiation and maintains predetermined optical distances.

7. (Canceled).

8. (Original) The hybrid collector of Claim 5 wherein said fiber further comprises a thermally compressed fiber bundle.

9. (Original) The hybrid collector of Claim 5 wherein multiple collectors are positioned in a mirror farm array connected to a single sun tracking system.

10. (Original) The hybrid collector of Claim 5 wherein said primary mirror is segmented into multiple sections.

11. (Original) The hybrid collector of Claim 5 wherein said secondary mirror is segmented into multiple sections.

12. (Original) The hybrid collector of Claim 5 wherein said primary mirror and secondary mirror are segmented into multiple sections.

**37 CFR 41.37 (c)(1)(ix) EVIDENCE APPENDICES**

The Declaration of Jeffrey D. Muhs ("Declaration") is reproduced as EVIDENCE APPENDIX A below as evidence entered by the Examiner and relied up by Appellants in this appeal. The Declaration was filed concurrently with the Notice of Appeal and the Pre-Appeal Brief Request for Review on 8/13/2008. The Declaration was received and considered by the Pre-Appeal Panel including the Examiner and the Examiner's Supervisor. The Examiner conferred with his Supervisor and subsequently, by telephone conference, asserted that the Declaration was made of record in the case. The Examiner also indicated that reliance on the Declaration as evidence for this appeal is proper. *See* Summary of Examiner Conferences filed 9/30/2008 which is included herein as EVIDENCE APPENDIX B below.

EVIDENCE APPENDIX A

Attorney Docket No. 63967.US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/824,291  
Applicants: MUHS, J. D. et al.  
Filing Date: 04/14/2004  
Confirmation No.: 1795  
Title: Hybrid Solar Lighting Distribution Systems and Components  
Examiner: Hall, Asha J.  
Group Art Unit: 6054

**DECLARATION OF JEFFREY D. MUHS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

1. I, Jeffrey D. Muhs am over 18 years of age and hereby declare as follows:
2. I live in Lenoir City, Tennessee United States of America and I am the author of the article "Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems," published in Solar 2000, July 16-21, by the American Solar Energy Society. This publication is referred to hereinafter as the "Muhs Reference."
3. I am also a co-inventor of U.S. Patent Application Serial Number 10/824,291 entitled "Hybrid Solar Lighting Distribution Systems and Components."
4. Figure 6b of the Muhs Reference shows a close-up view of large-core optical fiber ends as indicated in its caption. The large core optical fibers pass through a rectangular aperture defined by the primary mirror and into an angled, hollow mount. These features are labeled in the following illustration.

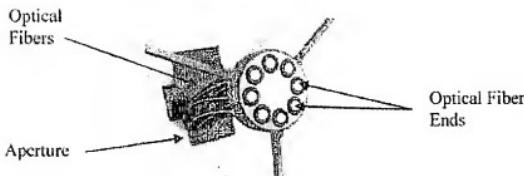


Figure 6b. Close-up view of large-core optical fiber ends.

5. There is no fiber distribution panel in Figure 6b, or described elsewhere in the Muhs Reference.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

  
\_\_\_\_\_  
Jeffrey D. Muhs

8-6-08  
\_\_\_\_\_  
Date

## EVIDENCE APPENDIX B

Attorney Docket No. 63967.US

### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/824,291  
Applicants: MUHS, Jeffrey D. et al.  
Filing Date: 04/14/2004  
Confirmation No.: 6054  
Title: Hybrid Solar Lighting Distribution Systems and Components  
Examiner: Mowla, Golam  
Group Art Unit: 1795

### SUMMARY OF EXAMINER CONFERENCES

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

#### Examiner Mowla:

Based on my notes and recollection, on the morning of September 23, 2008, you returned my phone call regarding this case. During this conference, you asserted that the attached Declaration of Jeffrey D. Muhs (the "Declaration"), which was timely filed concurrently with the Notice of Appeal and Pre-Appeal Brief Request for Review on 8/13/2008, was made of record in the patent file. You indicated that the reviewing panel, including yourself and your supervisor, considered the Declaration during the pre-appeal brief conference and found it unpersuasive. You indicated that, regardless of the evidence included in the Declaration, it was the panel's opinion that Figure 6 of the Muhs reference ("Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems", Solar 2000, July 16-21, 2000, American Solar Energy Society) disclosed a "fiber distribution panel" as claimed and described in the instant application. As such, in the Notice of Panel Decision from Pre-Appeal Brief Review mailed 8/26/2008, you continued the rejection of claims 1, 3-6 and 8-12 and indicated that the matter would proceed to the Board of Patent Appeals and Interferences.

I questioned whether, in drafting the Appeal Brief, I could properly rely on and reference the Declaration, and you offered to verify this with your supervisor.

You telephoned again during the afternoon of September 23, 2008. You reiterated that you considered the Declaration and discussed it with your supervisor during the pre-appeal conference. You, along with the panel, decided to continue the rejection despite the Declaration. At this time, I told you we were planning to pursue the appeal and put forth similar arguments as set forth in the RCE and the Pre-Appeal Request. I asked whether the Declaration was of record in the patent file and whether I could refer to and rely on the Declaration in the appeal brief. You indicated the Declaration was of record in the case and that I could properly refer to and rely on the Declaration in the appeal brief.

This summary is based on my notes of our conversations and my personal recollection. I trust that if you have a different recollection that you will let me know.

The undersigned is the agent of record and is the Applicants' representative.

Respectfully submitted,

LUEDEKA, NEELY & GRAHAM, P.C.

By:



Patrick B. Horne

Registration No. 58,753

Date: 9/30/2008  
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(865) 546-4305

Attachment: Declaration of Jeffrey D. Muhs

**37 CFR 41.37 (c)(1)(x) RELATED PROCEEDINGS APPENDIX**

There are no related proceedings to include in this appendix.